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## (54) CAPS FOR TANKS

(71) I, PAUL JOURNEE, of French nationality, of Chateau de Reilly, 60 Reilly, Chaumont-en-Vexin, France, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to caps for tanks, for example for tanks for containing liquid fuels, such as a motor vehicle tank.

Among the numerous causes of air pollution, residual emanation and discharge from motor vehicles are responsible for a substantial proportion.

The discharge of polluting substances from motor vehicles also involves, to a substantial extent, the volatile gases which escape for example due to agitation of the liquid fuel when the vehicle moves, and also because of evaporation due to the heat during some periods of the year.

According to the present invention, there is provided a cap for a tank, comprising a cap closure member, a decorative embellishment member carried thereon whereby a space is provided between the cap closure member and the embellishment member, at least one mass of a filtering or depolluting material disposed in said space, a grooved region in a surface of the cap closure member which is remote from the embellishment member, and at least one passage between said grooved region and said space, whereby gas from the tank on which in use the cap is fitted flows to the ambient air by way of said grooved region, said passage or passages and said material.

Two embodiments of a cap according to the present invention will now be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a side view of a first embodiment of the cap,

Figure 2 shows a diametric cross-section on an enlarged scale taken along line II—II in Figure 1,

Figure 3 shows a cross-section taken along line III—III of Figure 2,

Figure 4 shows a cross-section taken along line IV—IV of part of Figure 2,

Figure 5 shows an exploded view of the first embodiment of the cap, in a side view in one half of the figure and in a radial cross-section in the other half of the figure,

Figure 6 shows a side view in partial radial cross-section of the second embodiment of the cap,

Figure 7 shows a view in cross-section taken along line VII—VII of part of the cap of Figure 6,

Figure 8 shows a cross-section taken along line VIII—VIII in Figure 6,

Figure 9 shows an exploded view of the second embodiment of the cap of Figure 6, in side view in one half of the figure and in radial cross-section in the other half,

Figure 10 is a view in cross-section taken along line X—X of part of the cap of Figure 9,

Figure 11 is a view in cross-section taken along line XI—XI of part of the cap of Figure 9.

Referring first to Figures 1 to 5 and in particular Figure 2, a cap 4 is fitted on to an end portion 1 of an intake pipe to a fuel tank (not shown). The end portion 1 is turned inwardly at its end, to form an annular seat 2, and is then turned downwardly to form a ramp or catch portion 3 with which the cap co-operates so as to be firmly fixed in its closed position.

Generally the cap 4, which can be of any kind, e.g. locking or thief-proof, is so arranged as to house a mass 5 of a filtering or depolluting material, for example activated carbon.

The cap 4 comprises a locking means 6, the material 5 in the form of a cartridge 7, and a decorative embellishment member 8. The locking means 6 in this embodiment is formed by the association of a cap closure member 9 carrying a hub portion 10, an abutment end member 11 secured to a body 12 of the locking means by a pin 13, a return spring 14 which continuously urges rings 15 and 16 against each other, and an annular sealing gasket 17. The ring 15 has

radial projections which co-operate with the portion 3 to fix the cap on the tank intake pipe. The gasket 17 is normally applied against an adjacent grooved region of the internal surface of the cap closure member 9 by the force of the spring 14 acting through the rings 15 and 16. The labyrinth-like path of the grooves as denoted at 28 in Figures 2, 3 and 5 is clearly visible in Figure 3, the grooves being provided to carry gases which may flow, as will be described below, through the space between the hub portion 10 and the rings 15 and 16, to a passage or passages 18 in the cap closure member 9. The passage or passages 18 is or are also normally closed by the gasket 17, i.e. gas can flow into the passage or passages only through the grooves mentioned above. The cap closure member 9 has a screw-threaded outer peripheral surface 19 onto which the embellishment member 8 is screwed. The surface 19 is limited downwardly by a flange 20 having an annular groove 21 into which a lower edge portion 22 of the embellishment member 8 automatically engages when the embellishment member 8 is screwed onto the cap closure member 9.

In the embodiment illustrated, the cartridge 7 is formed by an envelope or casing 23 containing the material 5. The casing 23 has a depression 24 in its downwardly facing surface, the depression 24 thus extending upwardly in Figure 2. The bottom of the depression 24 has one or more apertures 25 aligned with the respective passage or passages 18. The surface of the cap closure member 9 which faces upwardly in Figure 2 has a raised portion 25 around the or each passage 18. The casing 23 is centrally apertured at 26 in such a way that the filtering cartridge 7 can be fitted onto the cap closure member 9, with the head of the locking means body 12 being engaged in the central aperture 26 in the cartridge 7 and the depression 24 capping the corresponding projection or raised portion 27 on the cap closure member 9. In this position the passage or passages 18 and the or each corresponding aperture 25 are aligned coaxially. Lateral passages 29 are provided between the cap closure member 9 and the corresponding adjacent part of the end portion 1 of the tank connection pipe. The above-described cap is such that gases discharged from the tank necessarily pass through the space between the hub 10 and the rings 15 and 16, so referred to above, and into the grooves 28 in the surface of the closure member 9, and thus reach the passage or passages 18 and the respective aperture or apertures 25 which provide access to the material 5. The gases are thereby filtered or de-polluted and can then be discharged to the ambient air by way of passages (not

shown) leading from the material 5 to the passages 29.

The embodiment of Figures 6 to 11 is generally similar to that of Figures 1 to 5 except that the embellishment member 8 is connected to the member 9 by a bayonet-like means, rather than by screwing.

It will be observed that the path followed by the gases from the tank as they pass through the cap is a complex circuit, which results in a pressure drop through the cap. This means that the cap will retain the gases in the tank until the gas pressure reaches a predetermined value; this is especially so because the material 5 presents a resistance to the flow of gas therethrough.

The path to be followed by the gases coming from the tank can be provided by a wide variety of circuits, provided that the gases pass through at least one mass of a filtering or de-polluting material. The envelope of the cartridge 7 can also be apertured in other ways, or can be porous, in any suitable manner.

Numerous modifications can be made, provided that the above condition as regards the gas flow is fulfilled, without thereby departing from the scope of the invention as defined by the appended claims.

#### WHAT I CLAIM IS:—

1. A cap for a tank, comprising a cap closure member, a decorative embellishment member carried thereon whereby a space is provided between the cap closure member and the embellishment member, at least one mass of a filtering or depolluting material disposed in said space, a grooved region in a surface of the cap closure member which is remote from the embellishment member, and at least one passage between said grooved region and said space, whereby gas from the tank on which in use the cap is fitted flows to the ambient air by way of said grooved region, said passage or passages and said material.

2. A cap according to claim 1 wherein the cap is such that said gas has access to said material only when the pressure of said gas exceeds a predetermined limit.

3. A cap according to claim 1 or claim 2 wherein said material forms a removable cartridge.

4. A cap according to claim 1, claim 2 or claim 3 wherein said material is enclosed in a casing or envelope which is permeable to said gas.

5. A cap according to any one of the preceding claims wherein said embellishment member is removable to provide access to said material.

6. A cap according to claim 5 wherein said embellishment member is screw-threadedly fixed on said cap closure member.

7. A cap according to any one of the preceding claims wherein a sealing gasket is disposed adjacent said grooved region, the gasket being co-operable with a tank intake pipe when in use the cap is fitted thereonto.

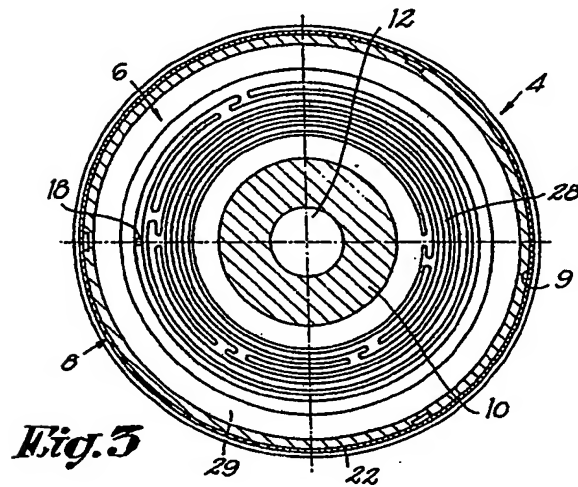
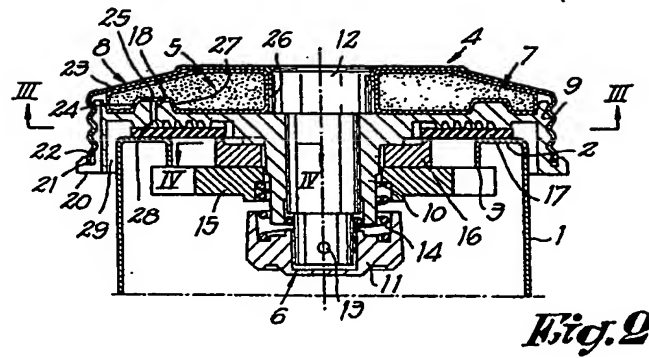
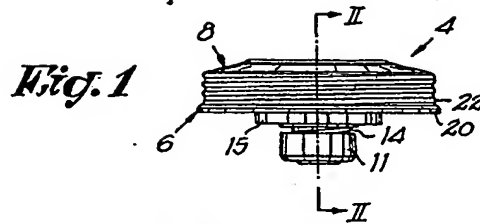
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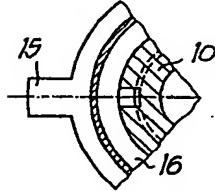
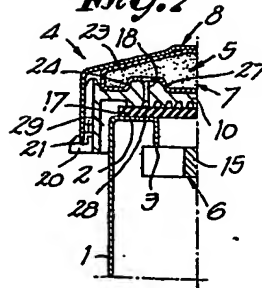
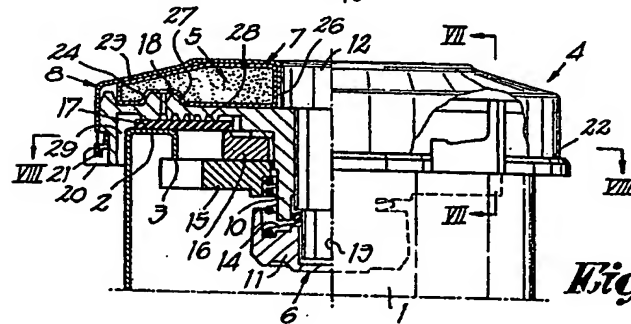
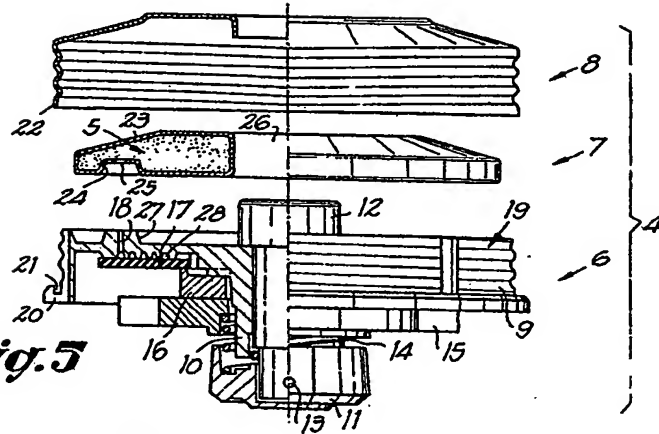
8. A cap for a tank, substantially as hereinbefore described with reference to

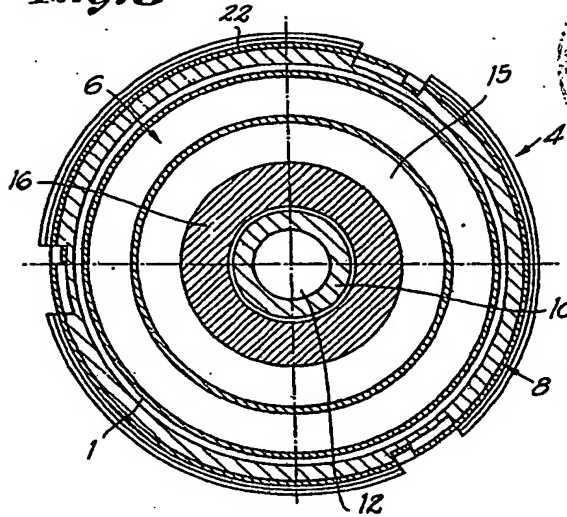
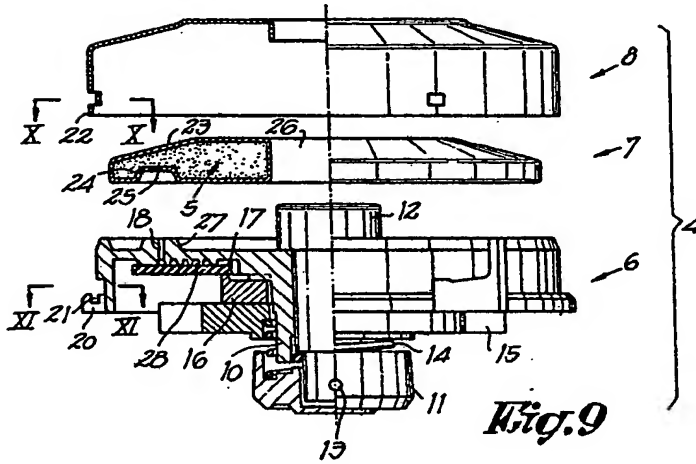
Figures 1 to 5 or Figures 6 to 11 of the accompanying drawings.

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**Fig. 4****Fig. 7****Fig. 5****Fig. 6**

*Fig. 8**Fig. 10**Fig. 11**Fig. 9*